

## **REMARKS/ARGUMENTS**

### Summary

This paper is responsive to the Final Office Action dated 20 May 2010 wherein claims 1, 3-6, 8-10 and 14-15 were rejected. By the present amendment, the following claims are currently amended: 1 and 14. No claims are canceled. Therefore, claims 1, 3-6, 8-10 and 14-15 remain pending in the case.

In view of the following remarks, Applicant requests further examination and reconsideration of the present patent application.

### Enterability under 37 CFR 1.116

The present claim amendments do not raise any new issues, since they are merely clarifying amendments intended to overcome certain rejections under Section 112 made in the Final Office Action. A specific response made to a specific rejection of the final action, which response could be foreseen based on the nature of the rejection, should not be considered as raising any new issues.

Furthermore, the amendments place the case in better condition for appeal, since fewer rejections will be in the case after entry of this amendment.

For all of the above reasons, the Examiner is respectfully requested to enter this paper.

### Rejections under 35 USC 112

The Office Action has rejected the following claims under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement: claims 1,3-6, 8-10, and 14-15 (i.e., all the claims in this case). In the point of view of the Action, these claims contain subject matter for which there is alleged doubt as to whether the inventors had possession of the claimed invention. In particular, in independent claims 1 and 14 the phrase "use of mineral acid doping" allegedly lacks clear antecedent basis in the specification as originally filed.

This rejection is respectfully traversed. The original specification clearly

supports that the inventors had possession of the claimed subject matter. As presently constructed, the claimed invention is embodied in claims 1 and 14 as follows:

"... adding to said aqueous salt containing medium in the system a treatment without mineral acid..."

This means that the treatment composition, which is added to the aqueous salt-containing medium, does not contain mineral acid.

The original specification clearly conveys that the inventive treatment for inhibiting  $Mg(OH)_2$  scale does not contain mineral acid. For example, please see Paragraph [0018]: "In another aspect, the present invention provides a composition and method for controlling scale deposition in desalination operations without the use of acid." See also Paragraph [0019]: "In a further aspect, the present invention provides a composition and method for controlling scale deposition, particularly magnesium hydroxide, in thermal desalination operations without the use of acid and thereby allowing the unit to operate at higher, more efficient temperatures." Yet further, the Examiner is directed to Paragraph [0046]: "In this testing it is observed that the maximum inhibition obtained without acid feed is significantly increased." The specification cannot be any more clear with regards to supporting the claimed negative limitation.

But, lest there be any doubt as to what kind of acid dosing which is being excluded by the invention, one need to put the above phrases into the context of the remainder of the invention. Firstly, the kind of acid feed which is excluded is clearly not any kind of phosphonic acid or carboxylic acid. These are weak acids which are explicitly *included* by the stark terms of the claims. So, it isn't *weak* acids which are excluded in Paragraphs [0018], [0019] and [0046]. It must be some type of strong acid.

Furthermore, the remainder of the specification provides the context in which the person of ordinary skill (the ultimate judge of whether support under 35 USC 112 exists) will understand the invention.

To put the presently claimed invention into context, it is helpful to have some background of the state of the industry at the time of the invention. At the time of

the presently claimed invention, the primary method to manage this issue was to add mineral acid to the feed water, commonly referred to as "acid doping" or "acid dosing" (See paragraph [0005], as well as col. 1, lines 14-22, of Hodgson) All of the then-known commercially available systems included addition of mineral acid feed water.

More specifically, in the background section (which is part of the original specification and would be known to the person of ordinary skill), a description of the prior art explains that the acid which is usually used to inhibit  $\text{Mg}(\text{OH})_2$  scale is a mineral acid: see Paragraph [0011]: " . . . scale inhibiting additive in conjunction with a mineral acid . . . "

In a comparative example, one type of mineral acid which is used is sulfuric acid: see Paragraph [0049], which defines acid feed: " . . . acid feed (sulfuric acid . . . "

In view of the support for the explicit exclusion of "acid" feed from the treatment, and the clear understanding that the type of acid referred to is the "mineral" acid of the prior art, it is believed that the rejection under 35 USC 112, first paragraph is not proper and should be withdrawn. The Examiner is respectfully requested to withdraw the rejection of the Office Action.

The Office action has rejected claims 1, 3-6, 8-10, and 14-15 under 35 U.S.C. 112, second paragraph, as being indefinite. The phrase "mineral acid doping" is said to be vague and indefinite because it is allegedly unclear how this term further limits the claims.

This rejection is respectfully traversed. The present claim amendment (a merely clarifying amendment, which is necessitated by the new rejection in the final rejection) states that the treatment employed is "without mineral acid". This means that although the treatment composition contains various polymer, it does not contain mineral acid. Thus the claim clearly sets forth the metes and bounds of what is comprised by the treatment, and what is not comprised by the treatment. It is respectfully requested that the Examiner withdraw this rejection.

The Official Action has also found that there is no clear antecedent in claim 1 for "the phosphonate polymer (I)". The Examiner is respectfully requested to withdraw this rejection in view of the clarifying amendment.

#### Rejections under 35 USC 103

The Official Action has rejected the following claims as being obvious in the sense of 35 USC 103 in view of the combination of Hodgson (US-4,204,953) and Becker (US-4,446,028): claims 1, 3-6, 8, 10, and 14-15.

Hodgson is said to disclose all the features of the claims except that it admittedly lacks "a specific phosphono functional polymer or a polymer of isopropenylphosphonic acid, and a dispersant respectively". However, the Action points to Becker for a teaching that "it is known in the art to utilize the recited polymers, to aid in inhibiting magnesium scale formation in a desalting or desalination system". The Action concludes that it would be obvious to modify Hodgson's method "by addition of the recited polymers and dispersant in view of the teachings of Becker, to aid in inhibiting magnesium hydroxide scale deposition in the desalination system".

This rejection is respectfully traversed. The rejection set forth in the Final Action does not provide a prima facie case for obviousness; and furthermore, the rejection cannot provide a reasonable expectation for success for the claimed method.

The Hodgson reference is discussed at Paragraph [0011] of applicants' original specification and forms no more than the very prior art problem which the present invention actually solves. Hodgson teaches a method for inhibiting deposition of scale from saline water onto exchanger surfaces by utilizing a scale-inhibiting additive (e.g., poly[maleic acid]) in conjunction with a mineral acid to neutralize part of the bicarbonate alkalinity. See for instance, column 1, lines 37-40 of Hodgson, and all the examples of Hodgson, and all its claims. The requirement in Hodgson to use acid dosing (e.g., with a mineral acid such as sulfuric acid or hydrochloric acid), teaches totally away from the present claim feature: "whereby the method inhibits formation of  $Mg(OH)_2$  scale on the structural parts of

the desalination system", yet the treatment is "without mineral acid".

In contrast, Applicants have found that the claimed combination of phosphono functional polymer I and carboxylate containing polymer II can control scale deposition in desalination operations without the use of acid, such as the mineral acids disclosed in the Hodgson reference and recited in the Background section of the present disclosure.

Becker '028 does not remedy the deficiencies of Hodgson. This Becker '028 reference has no teaching or suggestion for using a phosphono polymer on a medium which comprises magnesium cations and hydroxide anions under conditions in which, in absence of treatment,  $Mg(OH)_2$  scale would form. The Becker '028 reference simply does not deal with such a medium, nor does it teach one how to solve the problem of formation of this particular type of scale. Becker '028 states at its Column 2, lines 12-16: "The carbonates of magnesium and calcium are not the only problem compounds as regards scale, but also waters having high contents of phosphate, sulfate and silicate ions either occurring naturally or added for other purposes cause problems since calcium and magnesium, and any iron or copper present, react with each and deposit as boiler scale." There is no teaching of the specific problem of  $Mg(OH)_2$  deposition in desalination operations. Whatever is taught in Becker '028 is unlike inhibiting magnesium hydroxide scale formation on structural parts in contact with an aqueous salt containing medium in a desalination system. Thus, there is no reason or rationale as to why one would particularly wish to apply the phosphono functional polymers of Becker '028 to Hodgson, in the absence of any likelihood of success for inhibiting that particular type of scale.

This is especially important since the "motivational statement" of the rejection is stated as follows: one would combine Becker '028 into Hodgson "to aid in inhibiting magnesium hydroxide scale deposition in the desalination system".

The examiner states this not once but twice.

But, if Becker '028 does not inhibit magnesium hydroxide scale deposition in the desalination system, then this "motivational statement" is not correct. There would thus be no rationale or reason to combine the references, and the rejection must fall since it would not form a prima facie case of obviousness. The Examiner is

respectfully requested to withdraw the rejection. In the absence of a prima facie case of obviousness, there is no burden of proof on the applicant to supply further comparative data beyond that which is already attested to in the specification.

Finally, even if Becker '028 was somehow combined into Hodgson, it would not result in the present invention. That is, the present claims exclude mineral acid. But combining Becker '028 into Hodgson, would certainly result in a process which uses mineral acid doping, since there is no reasons within Becker '028 or elsewhere to dispense with or dispose of this aspect of the Hodgson reference.

Claim 9 has been rejected as being unpatentable over Hodgson in view of Becker '028 as applied to claim 1, and further in view of Bendiksen (US-5,087,376). It is believed that this rejection is defective for the same reasons as already stated above in reference to the combination of Becker '028 and Hodgson.

**SUMMARY**

For the reasons set out above, Applicant respectfully submits that the application is in condition for allowance. Favorable reconsideration and allowance of the application are, therefore, respectfully requested.

If the Examiner believes that anything further is necessary to place the application in better condition for allowance, the Examiner is asked to contact Applicant's undersigned representative at the telephone number below.

Any additional fees which may be due for the accompanying response are hereby petitioned for, and the Director is authorized to charge such fees as may be required to Deposit Account 090470.

Respectfully submitted,

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